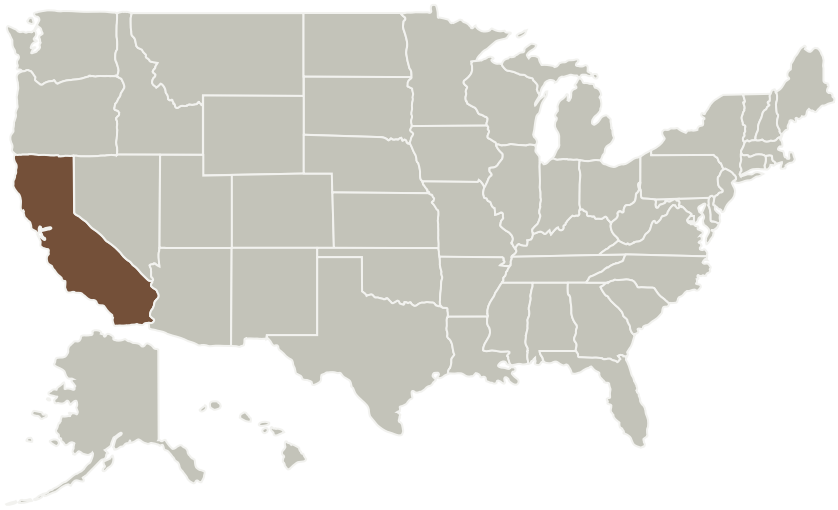
X-ray TKID Array Development for Astrophysics

Completed Technology Project (2018 - 2021)

Project Introduction

Low temperature detectors promise dramatic advances in energy resolution and pixel count over conventional X-ray detectors for future NASA X-ray missions. In this proposed research, we seek to develop and optimize a new kind of superconducting X-ray detector, known as a Thermal Kinetic Inductance Detector (TKID). These detectors could eventually have the energy resolution of the more mature Transition Edge Sensors (TESs), but with the ability to easily multiplex to much larger pixel counts. We will work to improve the TKID energy resolution to below 5 eV at 6 keV, develop mushroom absorbers to achieve high fill factor, and integrate these detectors into a 1 kpix array. We will also develop new readout firmware for our existing UVOIR MKID readouts to enable reading out these 1 kpix X-ray TKID arrays.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Science Mission Directorate (SMD)

Lead Organization:

University of California-Santa Barbara (UCSB)

Responsible Program:

Astrophysics Research and Analysis

X-ray TKID Array Development for Astrophysics

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Organizations Performing Work	Role	Type	Location
University of California-Santa Barbara(UCSB)	Lead Organization	Academia Asian American Native American Pacific Islander (AANAPISI), Hispanic Serving Institutions (HSI)	Santa Barbara, California
Office of Research	Supporting Organization	Industry	Santa Barbara, California
University of California-Berkeley(Berkeley)	Supporting Organization	Academia	Berkeley, California

Primary U.S. Work Locations
California

Project Management

Program Director:

Michael A Garcia

Program Manager:

Dominic J Benford

Principal Investigator:

Benjamin Mazin

Co-Investigators:

Karla Burris
Neelay H Fruitwala
Miguel D Daal

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes

Target Destination

Outside the Solar System